

## SAND AND MUD BAR (BROWNWATER SUBTYPE)

**Concept:** Sand and Mud Bars are communities of soft sediment deposits along rivers, nonforested because of recent deposition, frequent reworking, or frequent scouring. Vegetation generally is sparse or patchy. The Brownwater Subtype occurs along brownwater rivers, where clay deposition and circumneutral water chemistry influence the community.

**Distinguishing Features:** The Sand and Mud Bar type is distinguished by the combination of occurrence on soft sediments along a river shoreline and lack of a well-developed tree canopy. Vegetation ranges from herbs to shrubs, often at low density, and tree cover is low to nonexistent. Sand and Mud Bar should be recognized only where the patch is wider than the narrow band of shrubs present on most riverbanks. The Brownwater Subtype is distinguished by occurring on brownwater rivers. It contains species typical of brownwater systems that don't occur on blackwater rivers, such as *Platanus occidentalis*, *Acer negundo*, and *Fraxinus pennsylvanica*.

**Synonyms:** No NVC association appears to cover this community.

Ecological Systems: Atlantic Coastal Plain Small Brownwater River Floodplain Forest (CES203.250).

**Sites:** Sand and Mud Bar (Brownwater Subtype) communities occur wherever well-developed bars are present along brownwater rivers. Most are point bars on the insides of meanders, but they may occur on bars along straight reaches as well. Bars vary in slope and in elevation above the river but all are lower than the river banks.

**Soils:** No well-developed soil is present on the bars. The substrate consists of newly deposited or reworked sand, silt, or clay, sometimes with layers of leaf litter or debris buried by later sediment deposition. Often in the Brownwater Subtype the bulk of the bar appears to consist of sand but there is a thin layer of silt and clay deposited as the most recent flood flow waned. These layers may be removed by rain over time.

**Hydrology:** Sand and Mud Bars are frequently flooded. Natural flood regimes on brownwater rivers tend to include long duration floods and some very low flows. On rivers controlled by dams, the very high flows and the low flows are eliminated, but low-level floods may often last longer. This may have effects on the morphology of bars as well as on the vegetation. Though bars are deposited where the river current is the slowest along its course, during high flows currents are sometimes swift enough to scour or rework the surface. Sediment deposition may be heavy enough in some parts to be an important disturbance to the vegetation.

**Vegetation:** Sand and Mud Bar communities have sparse to moderately dense herbaceous vegetation with variable cover of small woody plants. In the Brownwater Subtype the typical woody species are young *Salix nigra*, *Betula nigra*, *Fraxinus pennsylvanica*, *Platanus occidentalis*, and on the Roanoke River, often *Acer saccharinum*. *Hibiscus laevis* or *Hibiscus moscheutos* often is present though rarely very dense. The herbs are tremendously variable. *Coleataenia rigidula* and *Echinochloa crusgalli* are perhaps the most frequent species. On the Roanoke River, *Leersia oryzoides* is frequent (Rice et al. 2001). On the Neuse River, species at least fairly frequent include *Carex louisianica*, *Carex tribuloides*, *Carex typhina*, *Leersia*

*virginica*, *Rumex conglomeratus*, *Erectites hieracifolia*, *Mikania scandens*, *Comellina virginica*, *Comellina communis*, *Eclipta prostrata*, *Elymus virginicus*, *Persicaria punctata*, *Persicaria hydropiperoides*, *Persicaria sagittate*, *Rumex crispus*, *Peltandra virginica*, *Viola* spp., and the exotic species *Murdannia keisak*, *Microstegium vimineum*, *Alternanthera philoxeroides*, and *Humulus japonicus* (Faestal 2012).

**Range and Abundance:** No G-rank has been assigned. The Brownwater Subtype appears to be irregularly distributed among brownwater rivers. Faestal (2012) noted that there were few bars on the Cape Fear River and the author's experience suggest there are few on the Roanoke. Both of these rivers meander relatively little. Bars are more numerous on the Neuse River and perhaps on the Tar. Similar bar communities presumably occur along brownwater rivers throughout the Southeast, though it is uncertain how widely they would be regarded as the same NVC association.

**Associations and Patterns:** Sand and Mud Bars occur along river channels, generally on the inside of active meanders. They generally grade to Brownwater Levee Forest of some subtype on the landward side.

**Variation:** Variation in communities has not been clarified but may be sufficient to recognize a different variant for the Roanoke than for North Carolina's other brownwater rivers. Extreme heterogeneity at fine scales within patches, along with potential for drastic changes in vegetation with time makes recognition of consistent variants difficult. There presumably are significant differences between areas that have stabilized and are undergoing directional succession compared to those that are regularly reworked or scoured.

**Dynamics:** Sand and Mud Bars are among the most dynamic natural communities in North Carolina. Their location is tied to river channel patterns and is predictable but the vegetation and even the configuration of the site may potentially be changed drastically by a single flood. Slower changes, over periods of years or dozens of years, also occur as river meanders migrate and older portions of bars become more sheltered or stabilize. Long-lived plant species may be present but much of the vegetation is newly established and much may be ruderal or short-lived. Regular input of propagules collected over a large area may be an important determinant of plants present. The species present and their abundance may be very different at different times.

Though not well known, it is likely that bar configuration and vegetation are in short-term equilibrium with river behavior but that they respond to changes in river flood regimes caused by climatic cycles. The cycles of wetter or drier weather on the scale of 30 years documented by Stahle et al. (1988) may be important to them. The changes caused by upstream dams may also affect them in ways that are not widely recognized.

**Comments:** Study of this community is limited. Though both Faestal (2012) and Rice (et al. 2001) included it in their classifications, the number of plots was limited. Site observations are extremely limited.

**Rare species:** None are known.

**References:**

- Faestal, M. 2012. Classification and description of alluvial plant communities of the North Carolina Coastal Plain. M.S. thesis, University of North Carolina, Chapel Hill.
- Rice, S.K., R.K. Peet, and P. Townsend. 2001. Gradient analysis and classification of the forests of the lower Roanoke River floodplain, North Carolina: a landscape perspective. Unpublished manuscript.
- Stahle, D.W., M.K. Cleaveland, and J.G. Hehr. 1988. North Carolina climate changes reconstructed from tree rings A.D. 372 to 1985. *Science* 240: 1517-1519.